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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/394,189	09/13/1999	PAUL A. UNDERBRINK	B-64418	3874

20594 7590 11/05/2002

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EXAMINER
CRAVER, CHARLES R

ART UNIT	PAPER NUMBER
2685	

DATE MAILED: 11/05/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/394,189	Applicant(s) Underbrink et al
	Examiner Charles Craver	Art Unit 2685

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Aug 21, 2002* .

2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-6, 8-12, 22-28, 30, and 31* is/are pending in the application.

4a) Of the above, claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-6, 8-12, 22-28, 30, and 31* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 27 is rejected under 35 U.S.C. 102(b) as being anticipated by Erturk, IEEE #0-7803-3216.

Regarding claim 27,

Erturk discloses a method for wireless communication, comprising

providing a patch antenna (FIG 1), and performing a finite-element analysis on the design of the antenna so as to optimize the impedance of the antenna (page 1 line 29-page 2 line 19) for use with the rest of the wireless device (page 1 lines 1-3), inherently comprising steps of determining the transmitter impedance as well as the estimated impedance of the antenna,

optimizing the area of the antenna (i.e. the notch, page 1 lines 25-29) to match the impedance, and

providing the patch antenna for use in wireless communications, inherently via a device.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-4, 6, 8, 9, 11, 12, 22-26 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuru in view of Krenz, Lane and Erturk.

Regarding claim 1,

Tsuru discloses a hand-held communications device (1),

an antenna (3) coupled to the device (col 3 lines 32-56), the antenna configured so as to radiate with greater field intensity over an area of less than 360 degrees of arc (col 3 line 57-col 4 line 20, see FIG 11),

inherently, a transmitter amplifier, and

wherein the portion of the field that is of greater intensity is in the direction away from the head of the user of the device (col 1 lines 52-59, col 2 lines 13-24).

Tsuru does not specifically disclose that the transmitter and antenna impedances are matched, and that the matching is determined by a finite element analysis and adjustment of the antenna impedance.

Krenz discloses the utility of matching the impedance of an antenna to a transceiver (col 1 lines 37-39, col 2 lines 44-51).

Lane discloses that a patch antenna's impedance is based on its surface area (col 3 lines 37-51).

Erturk discloses that one method for determining the characteristics of a patch antenna is via a finite element analysis based on the surface area (page 1 line 25-page 2 line 19, FIG 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add such a feature to Tsuru, as matching the impedance of the transmitter and antenna provides for more efficient operation and sensitivity. Further, by analyzing the surface area of the antenna, the impedance may be modeled, as suggested by Erturk and Lane; thus, one of ordinary skill in the art would have no doubt been motivated to analyze the area of the patch antenna (finite element analysis) to determine the antenna's impedance, thus notifying him or her how much the antenna may be adjusted in order to match the impedance to the transceiver.

Regarding claim 2,

since Tsuru teaches a radiotelephone, which typically operates on a single channel, or narrow band, it is inherent that a signal radiated from the device would be within a narrow and predetermined band.

Regarding claim 3 and 4,

Krenz further discloses that it is useful to provide a loop antenna or a patch antenna (col 2 lines 35-39).

Regarding claim 6,

Tsuru further discloses that it is useful to couple a receive antenna (col 5 lines 51-55) to the hand-held device.

Regarding claim 8,

Tsuru discloses a hand-held wireless cellular communications device (1,), and

a transmit antenna (33) and a receive antenna (34) coupled to the device (col 2 lines 3-12 and col 5 lines 25-55), and, inherently a transmitter amplifier.

Tsuru does not specifically disclose that the transmitter and antenna impedances are matched, and that the matching is determined by a finite element analysis and adjustment of the antenna impedance.

Krenz discloses the utility of matching the impedance of an antenna to a transceiver (col 1 lines 37-39, col 2 lines 44-51).

Lane discloses that a patch antenna's impedance is based on its surface area (col 3 lines 37-51).

Erturk discloses that one method for determining the characteristics of a patch antenna is via a finite element analysis based on the surface area (page 1 line 25-page 2 line 19, FIG 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add such a feature to Tsuru, as matching the impedance of the transmitter and antenna provides for more efficient operation and sensitivity. Further, by analyzing the surface area of the antenna, the impedance may be modeled, as suggested by Erturk and Lane; thus, one of ordinary skill in the art would have no doubt been motivated to analyze the area of the patch

antenna (finite element analysis) to determine the antenna's impedance, thus notifying him or her how much the antenna may be adjusted in order to match the impedance to the transceiver.

Regarding claim 9,

Krenz discloses a cellular phone (col 1 line 65-col 2 line 13).

Regarding claim 11,

Krenz further discloses that it is useful in a hand-held communication device (100) with an antenna (105), to provide a patch antenna (col 2 lines 35-39), which would be contained within the housing of the unit.

Regarding claim 12,

while Krenz discloses a patch antenna, it is not disclosed that the patch antenna may be contained within an IC package, it was well known in that art at the time of the invention to integrate a patch antenna into an IC, as shown by the teachings of Filimon, where it is stated that a patch antenna may comprise a piece of copper foil mounted to the inside of the device, and that the patch antenna may be a conductive coating applied directly to a panel (col 3 line 64-col 4 line 2 and lines 43-47). As such, the examiner takes Official Notice of such a feature, as the need to reduce the size and complexity of the circuit would obviously motivate one of ordinary skill in the art to enclose such antennae in an IC package, especially given the suggestion of a conductive coating, as an IC package would reduce production costs by eliminating extra components.

Regarding claim 22,

Tsuru discloses a method for use in a hand-held communications device (1), comprising

modulating speech data onto a signal,

transmitting the signal, inherently from a transmitter amplifier, from an antenna (3) coupled to the device (col 3 lines 32-56), the antenna configured so as to radiate with greater field intensity over an area of less than 360 degrees of arc (col 3 line 57-col 4 line 20, see FIG 11),

wherein the portion of the field that is of greater intensity is in the direction away from the head of the user of the device (col 1 lines 52-59, col 2 lines 13-24).

Tsuru does not specifically disclose that the transmitter and antenna impedances are matched, and that the matching is determined by a finite element analysis and adjustment of the antenna impedance.

Krenz discloses the utility of matching the impedance of an antenna to a transceiver (col 1 lines 37-39, col 2 lines 44-51).

Lane discloses that a patch antenna's impedance is based on its surface area (col 3 lines 37-51).

Erturk discloses that one method for determining the characteristics of a patch antenna is via a finite element analysis based on the surface area (page 1 line 25-page 2 line 19, FIG 1).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to add such a feature to Tsuru, as matching the impedance of the transmitter and antenna provides for more efficient operation and sensitivity. Further, by analyzing the surface area of the antenna, the impedance may be modeled, as suggested by Erturk and Lane; thus, one of ordinary skill in the art would have no doubt been motivated to analyze the area of the patch

antenna (finite element analysis) to determine the antenna's impedance, thus notifying him or her how much the antenna may be adjusted in order to match the impedance to the transceiver.

Regarding claim 23,

Tsuru discloses receiving an incoming signal at a second antenna (34, col 5 lines 43-55).

Regarding claim 24,

Krenz further discloses that it is useful in a hand-held communication device (100) with an antenna (105), to provide a patch antenna (col 3 lines 35-39), which would be contained within the housing of the unit.

Regarding claim 25,

Tsuru further discloses receiving signals with a monopole antenna (col 1 lines 16-25).

Regarding claim 26,

Tsuru further teaches a monopole antenna for receiving signals (col 5 lines 43-55).

Regarding claim 31,

given that Tsuru in view of Krenz, Lane and Erturk disclose a cellular telephone, inherently communicating via at least two base stations, the orientation of the portable device would vary during its use; that is to say, a situation in which the device was communicating with one base station while facing one direction, and then later with another base station while pointed arbitrarily in another direction, would have been realized by one of ordinary skill in the art as naturally occurring in an invention such as the combined invention of Tsuru in view of Krenz, Lane and Erturk, given that the claim language does not state that the phone would pick a base

station to communicate with based on its orientation, or that it would only communicate with one station or the other based on its orientation.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuru in view of Krenz, Lane and Erturk as applied to claim 1 above, and further in view of Flowerdew et al.

Tsuru in view of Krenz, Lane and Erturk discloses applicant's invention of claim 1, and further states that it is useful to couple a receive antenna (col 5 lines 51-55) to the hand-held device. Tsuru does not disclose that the receive antenna has a filed of reception orthogonal to the field of reception of the transmit antenna.

Flowerdew discloses that it is useful in a hand-held device (104) comprising a transmit antenna (904) and a receive antenna (902) to provide the two antennas with mutually orthogonal fields of transmission/reception (col 8 lines 25-61).

Therefore, it would have been obvious to one skilled in the art to add such a function to Tsuru in view of Krenz, Lane and Erturk, since Flowerdew states that orthogonal fields minimize mutual coupling (col 13 lines 36-48), which is advantageous.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsuru and Krenz, Lane and Erturk as applied to claim 8 above, and further in view of Flowerdew.

Tsuru in view of Krenz, Lane and Erturk discloses applicant's invention of claim 8, but does not disclose that the receive antenna has a filed of reception orthogonal to the field of reception of the transmit antenna.

Flowerdew discloses that it is useful in a hand-held device (104) comprising a transmit antenna (904) and a receive antenna (902) to provide the two antennas with mutually orthogonal fields of transmission/reception (col 8 lines 25-61).

Therefore, it would have been obvious to one skilled in the art to add such a function to Tsuru and Krenz, Lane and Erturk, since Flowerdew states that orthogonal fields minimize mutual coupling (col 13 lines 36-48).

7. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Erturk.

As shown above, Erturk discloses applicant's invention of claim 27. While not disclosing that the amplifier system's impedance is specifically 10 ohms, it would have been obvious to one of ordinary skill in the art at the time of the invention that transmitter amplifiers with such characteristic impedances were available, and as such, such a value would have been the product of a routine engineering decision, that is, the choice of transmitter amplifier used in a particular embodiment of the invention.

8. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Erturk as applied to claim 27 above, and further in view of Naitou.

While disclosing applicant's invention of claim 27 above, Erturk does not disclose that the adjustment may be operable to change the antenna pass band.

Naitou suggests that antennas may be adjusted so as to tune to a particular channel, i.e. change the passband characteristic of the antenna (col 1 lines 15-21), thus reducing the need for further filtering.

Given such a suggestion, it would have been obvious to one of ordinary skill in the art at the time of the invention to add such a feature to Erturk, who teaches the utility of adjusting a patch antenna, while Naitou suggests adjustment of antenna passbands is preferable, and as such, adding such a feature to Erturk would provide better response and sensitivity.

Response to Arguments

9. Applicant's arguments filed 8-21-02 have been fully considered but they are not persuasive.

Regarding claim 27, the examiner upholds the rejection, noting that the invention of Erturk et al would inherently provide a step of determining the impedance of both the device output (i.e. from the amplifier) and the antenna; this is because Erturk teaches a system for optimizing an antenna's impedance compared to that of an amplifier. In such a case, the impedance of the amplifier would have to be measured in order to determine what impedance the antenna would need to be set at in order to match. Also, since Erturk discloses adjustment of the antenna surface area in order to fine tune the impedance, such would inherently involve an

estimate of the needed antenna impedance, which would, of course, be that of the output of the amplifier.

Regarding the combination of references under 35 USC 103(a), the examiner refers to the support for Erturk's teaching of a finite element analysis above. Further, note that Krenz and Lane suggest matching an antenna impedance to an amplifier, in order to optimize performance. Given that Erturk provides the means to match said antenna to the output of the transmitter (i.e. amplifier), and given that Krenz and Lane provide suggestions to match the impedance of the two elements, the examiner continues to assert that one of ordinary skill in the art would have been motivated to match the antenna and amplifier impedance. Regarding the applicant's accusation that the examiner's rejection is proof that he is merely using the references as a 'roadmap', the examiner reminds the applicant that the previous grounds of rejection (i.e. the first Office Action) have absolutely no bearing on the current grounds of rejection, and that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made (that is, the design of antennas and the matching of impedance), and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). In response to applicant's implication that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh

against the obviousness of the claimed invention. See *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991).

Conclusion

10. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

11. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to:

(703) 872-9314, (for formal communications intended for entry)

Or:

(703) 872-9314 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington VA, sixth floor (receptionist).

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles Craver whose telephone number is (703) 305-3965.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ed Urban, can be reached on (703) 305-4385.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 305-4700.

cc

C. Craver
October 31, 2002

EDWARD F. URBAN
SUPERVISORY PATENT EXAMINER
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